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Arthroscopic Hip Labral Repair: The Iberian Suture Technique

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Abstract: Arthroscopic hip labral repair has beneficial short-term outcomes; however, debate exists regarding ideal surgical labral repair technique. This technical note presents an arthroscopic repair technique that uses intrasubstance labral suture passage to restore the chondrolabral interface. This “Iberian suture technique” allows for an anatomic repair while posing minimal risk of damage to the labral and chondral tissues.

The acetabular labrum plays an integral role in hip biomechanics and cartilage preservation. Prior studies have shown that the acetabular labrum stabilizes the femoral head during range of motion and creates a seal that maintains hip joint pressurization and prevents cartilage consolidation.^{1,2} Although the labrum is relatively avascular, receiving most of its blood supply from the hip capsule,³ healing of the labrum to acetabular bone with fibrovascular scar has been shown in an ovine model.⁴ In a recent literature review, Haddad et al.⁵ support repairing unstable labral tears to preserve the physiological function in labral tissue of sufficiently good quality; however, routine fixation of all degenerative labral tears is not supported. Arthroscopic labral repair has been shown to result in improved clinical outcomes, with a trend toward joint space preservation, when compared with arthroscopic labral debridement at 1 year.⁶ Philippon et al.⁷ showed that arthroscopic repair, as opposed to debridement, and preoperative joint space greater than 2 mm were associated with good outcomes at 2 years.

The question arises as to what technique should be used for repair of labral injuries occurring at the chondrolabral junction of healthy labral tissue to optimize the chances of healing and recovery.⁸ Controversy exists regarding the ideal technique—simple loop repair versus a more complex intrasubstance repair—during labral cartilage preservation surgery. Intrasubstance repair is technically demanding and poses a theoretical risk of failure because of its reliance on intrasubstance suture passage through damaged tissue. We present an arthroscopic intrasubstance suture repair technique that restores native labral anatomy in instances in which damaged labral tissue remains adequate for repair. The described technique is referred to as the “Iberian suture technique,” taking its name from a Spanish equestrian knot from which it is derived.

Surgical Technique

The patient is placed in a modified supine position, and adequate traction across the hip joint is verified by fluoroscopy. After the anterolateral and mid-anterior portals are established, a 70° arthroscope is placed in the anterolateral portal and a probe is placed in the mid-anterior portal (Video 1). Linear and translational instability of the labral tissue is inspected and assessed for potential repair (Fig 1). Labral tissue adequate for repair should lack intrasubstance degradation, fraying, complex tearing, or calcification. The arthroscope is moved to the mid-anterior portal, and a full-radius shaver is introduced through the anterolateral portal. A bony rim preparation is then performed with care taken to preserve as much healthy-appearing labral tissue as possible. This approach is taken retrograde from the capsular side without formal labral takedown. Once the frayed labral and chondral tissue is removed, the arthroscope is returned to the anterolateral portal and

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Fig 1. Chondrolabral interface with probe showing detachment of labrum from chondral junction. View of left hip, with camera positioned in anterolateral portal.



Fig 3. Suture passer delivering suture loop through injured chondrolabral junction into articular space. View of left hip, with camera positioned in anterolateral portal.

the shaver to the mid-anterior portal. Focal chondroplasty is performed and small linear labral tears are debrided, while the preservation of all healthy labral tissue is ensured. The portals are again switched, returning the camera to the mid-anterior portal. The acetabular rim is again identified, and focal chondroplasty and acetabuloplasty are completed. A 5.5-mm high-speed arthroscopic burr is often used to complete the rim preparation and create a bleeding bone base to which labral tissue may heal (Fig 2). Caution must be taken with the high-speed burr to prevent over-resection of the acetabular rim and avoid errant incarceration of labral tissue within the burr.

Once adequate debridement, chondroplasty, and bony rim preparation are complete, the drill guide for the suture anchor is placed through the mid-anterior portal through a wide, clear cannula (ClearTrac, 8.5 mm × 110 mm; Smith & Nephew, Andover, MA). The angle of incidence of the drill guide to the bone should ensure that the chondral surface will not be violated during drilling. Fluoroscopic guidance may be used at this time to ensure that a safe intraosseous path will be created for the anchor. Once the drill guide is



Fig 2. Extra-articular view of bony rim preparation made with high-speed arthroscopic burr to create bleeding bony bed for healing to occur. View of left hip, with camera positioned in mid-anterior portal.

satisfactorily positioned, the corresponding drill for the suture anchor is then passed into the guide. The drill is advanced into the bony rim slowly under power. We position the arthroscope to allow inspection of the chondral surface, to ensure that it is not violated during drilling. The system used at our institution has an automatic stop built into the guide, which prevents over-advancement of the drill. The drill is then removed and the suture anchor is deployed, with the suture axis perpendicular to the bony rim. Our preference is to use a 2.3-mm osteoinductive, bioresorbable, single-loaded suture anchor (Osteoraptor, 2.3 mm; Smith & Nephew). The acetabulum is again inspected to ensure that the anchor does not penetrate the articular surface, and the integrity of anchor purchase is checked with a gentle shuck test. With the single-loaded suture anchor in place, there will be 2 free limbs of suture exiting the cannula. One suture will become the working limb, and the other will serve as the arthroscopic post.

With the arthroscope in the anterolateral portal, a highly polished micro-suture passer (Arthropierce, 1.8 mm, with No. 2 Ultrabraid suture; Smith & Nephew) is introduced through the mid-anterior portal, and 1 limb of suture is grasped. This limb of suture is then passed along the chondrolabral interface (Fig 3), creating a suture loop on the articular side of the repair (Fig 4). The suture is released from the suture passer, and the instrument is repositioned along the capsular side adjacent to the anchor. The labrum is critically assessed to ensure that there is tissue of adequate integrity to allow for intrasubstance repair. The empty micro-suture passer is then carefully aligned and advanced through the midsubstance of the labrum by use of a direct trajectory, with minimal oscillations and constant gentle pressure. The suture loop that was previously passed to the articular side is then grasped with the instrument (Fig 5). The loop is pulled through the intrasubstance of the labrum so that the loop and both free ends of the suture are now along the capsular



Fig 4. Suture loop created in intra-articular position, placed through injured chondrolabral junction. View of left hip, with camera positioned in anterolateral portal.

side and adjacent to the anchor. The micro-suture passer is then passed through the loop of suture, and the contiguous free limb is grasped. Care must be taken to ensure that the correct limb of suture—the limb that is contiguous with the loop—is grasped, and the instrument is then brought out through the cannula. The suture limb is pulled completely through the loop and tightened, thereby creating a pulley on the anchor side of the repair. A knot pusher is then placed on the arthroscopic post, and a timberline 3-hitch arthroscopic knot technique is used. The knot pusher is used to gently tension the knot to a degree that approximates the natural tissue tension across the labrum, with care taken to avoid iatrogenic insult to the labrum. The timberline hitch is maintained in position with a single square knot, a total of 5 hitches are created to complete the knot, and the suture is then cut with an arthroscopic suture cutter. The chondrolabral interface is reassessed, and the process may be repeated, starting with suture anchor placement, if further labral fixation is required. Once the repair is complete, the hip is gently reduced into the acetabulum as traction is



Fig 5. After being passed through the midsubstance of the labrum, the suture passer grasps the intra-articular loop, which will next be pulled out onto the extra-articular side of the repair. View of left hip, with camera positioned in anterolateral portal.



Fig 6. With the femoral head (FH) reduced off traction, the suture knot can be seen in an extra-articular position along the capsulolabral interface. The seal function of the labrum has been restored. View of left hip, with the camera positioned in the mid-anterior portal.

removed (Fig 6). A peripheral suction-seal integrity test is performed on the labrum to assess the repair while gentle traction is reapplied to the leg. One should see the escape of fluid from the central compartment as the labral seal is disrupted by the reapplication of traction.

Discussion

Early published data indicate that repair of the acetabular labrum is associated with improved outcomes and joint space preservation at short-term follow-up.⁷ We believe that intrasubstance repair of the acetabular labrum with the Iberian suture technique effectively restores the biomechanical stability of the native labrum and has several distinct advantages over other labral repair techniques. One advantage is that this technique allows knot tensioning to occur by a pulley effect, by relying on the creation of suture-on-suture tension. In contrast, if the free limb of the knot is tensioned across injured labral tissue, the suture may act with a Gigli saw effect and cause further damage to the labrum. Thus the Iberian technique has the theoretical potential to have a lower cutout rate as compared with other techniques that rely solely on tension integrity across injured labral tissue. The Iberian suture technique also allows for suture management through a single portal, thereby saving time and avoiding the frustration of multiple instrumentation changes during the repair. Another advantage is the capsular position of the knot, which is unable to slide into the articular side of the labral tissue, thereby protecting the articular chondrolabral surfaces. We have found that the Iberian suture technique most effectively restores the native anatomy of the chondrolabral interface while minimizing the risk of everting labral tissue during the repair process. As a result, patients may participate in early and consistent rehabilitation protocols without concern for repair slippage. A final

Table 1. Technical Tips and Pearls

Achieve adequate traction across the hip joint and ensure accurate placement of portals to optimize visualization throughout the operation.
Appropriately select patients whose labral pathology maintains adequate tissue that is amenable for intrasubstance repair and lacks significant fraying, tissue degradation, or complex tear patterns.
Debride small linear labral tears and fraying while preserving as much healthy labral tissue as possible.
Use fluoroscopic guidance, if necessary, to ensure safe intraosseous drilling and to avoid violating the chondral surface.
Do not “clamp” the suture with the passer; rather, grasp it so that it will slide freely within the passer.

advantage of this technique is that as knot tensioning occurs on the capsular side of the labrum, the knot may be completed with the hip reduced and off traction to ensure that the labral seal function is maintained. There are, however, risks and limitations with using the Iberian suture technique that are worth mentioning. This method of repair is technically challenging and relies on precise and accurate anchor placement. The Iberian suture technique is highly dependent on adequate labral tissue quality that is sufficient to withstand intrasubstance suture passage, and as such, it is not appropriate to use in all acetabular labral repair scenarios.

Anatomic repair of the acetabular labrum with the Iberian suture technique effectively re-creates the seal function of the acetabular labrum in individuals with chondrolabral dysfunction and shows promising early results. This repair method is technically demanding, and there are several key details that are integral to achieving a successful outcome (Table 1). Similarly, we recognize limitations of this intrasubstance repair technique and the need to exercise caution to avoid potential technical pitfalls (Table 2). Further studies are required to determine the long-term efficacy of the Iberian suture technique in patients' return to function and the prevention of hip osteoarthritis.

Table 2. Limitations and Avoidance of Pitfalls

The technique is technically demanding and dependent on appropriate patient selection criteria.
There is a theoretical risk of failure because of intrasubstance suture passage through already damaged tissue.
Avoid over-resection of the acetabular rim during bony rim preparation, and exercise caution while using the high-speed burr to prevent errant incarceration of labral tissue within the burr.
Use caution while piercing labral tissue with the micro-suture passer, and gently tension the suture during knot tying in order to avoid propagation of labral tears.
Incorrectly using the micro-suture passer to “clamp” suture may result in suture pullout or pull-through and cause iatrogenic labral injury.

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